

What is Claimed Is:

1. A method of fabricating an air data sensor assembly comprising the steps of:
 - a. forming a flexible printed circuit on a polymeric film having at least one aperture in the film and flexible printed circuit;
 - b. attaching a relatively thin air data sensor to the flexible circuit adjacent to and in fluid communication with the aperture; and
 - c. attaching a flexible substrate having an adhesive layer to the air data sensor and flexible printed circuit resulting in a conformable air data sensor assembly for sensing an air parameter in the air adjacent the polymeric film using the air data sensor via the aperture.
2. The method of claim 1 further comprising an additional step b1 between steps a and c:
 - b1. attaching a data acquisition circuit to the flexible printed circuit.
3. The method of claim 2 wherein step c further comprises providing an optical interconnection between the air data sensor and the data acquisition circuit.
4. The method of claim 1 wherein steps a, b, and c are performed to result in a plurality of conformable air data sensor assemblies, and wherein the method further comprises:
 - d. storing the plurality of assemblies in roll form.
5. The method of claim 1 wherein steps a, b, and c are performed to result in a plurality of conformable air data sensor assemblies, and wherein the method further comprises:
 - d. storing the plurality of assemblies in roll form with a release layer attached to the adhesive layer.

6. The method of claim 1 further including a step of:
 - d. initially attaching a release layer to the adhesive layer.
7. The method of claim 6 further including the following steps of:
 - e. subsequently removing the release layer; and
 - f. installing the conformable air data sensor assembly on a surface for which air data in a boundary layer adjacent the surface is to be sensed.
8. The method of claim 1 wherein step b further includes electrically connecting the air data sensor to the flexible circuit using one or more solder connections.
9. The method of claim 1 wherein the air data sensor further includes a pressure sensor.
10. The method of claim 9 wherein the air data sensor further includes a temperature sensor.
11. The method of claim 9 wherein the air data sensor further includes a data acquisition circuit.
12. The method of claim 11 wherein the air data sensor still further includes a battery.
13. The method of claim 1 wherein step b includes electrically connecting a plurality of components to the flexible printed circuit.
14. The method of claim 13 wherein at least some of the plurality of components have spaces adjacent thereto, and the method further comprises a step of:
 - d. filling the spaces with epoxy or flexible potting compound.

15. The method of claim 14 further comprising the step of:
 - e. attaching an optical fiber interconnect layer to at least one of the components.
16. The method of claim 15 wherein step e further comprises forming the optical fiber interconnect layer from a polyimide providing optical interconnections between the components.
17. The method of claim 15 wherein the optical fiber interconnect layer includes an optical fiber to waveguide coupler.
18. The method of claim 17 wherein the coupler and adhesive layer are attached to the flexible substrate before assembly of the remainder of the conformable air data sensor assembly.
19. The method of claim 18 wherein the coupler and adhesive layer are attached to the flexible substrate after assembly of the remainder of the conformable air data sensor assembly.
20. The method of claim 1 wherein step a further comprises depositing a polymer thick film on a back side of the polymeric film using a stencil, screen printing, or ink-jet processing technique.
21. The method of claim 1 further comprising the additional step of:
 - d. applying pressure between the conformable air data sensor assembly and a surface adjacent which air data is to be taken such that the air data sensor assembly closely conforms to the surface to which it is attached.

22. The method of claim 21 wherein a release layer is initially attached to the adhesive layer further comprising the additional step before step d of:

- d. removing the release layer from the adhesive layer.